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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/578,583	05/25/2000	Kevin Kwong-Tai Chung	A-I-TECH-16A	7346

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EXAMINER

DINH, TUAN T

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 09/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/578,583

Applicant(s)

CHUNG, KEVIN KWONG-TAI

Examiner

Tuan T Dinh

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) 1-15 and 37-51 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-30 and 32-36 is/are rejected.
- 7) ☒ Claim(s) 31 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 May 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2,3</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's election with traverse of Group II (claims 16-36) in Paper No. 5 is acknowledged. The traversal is on the ground(s) that "at least one layer of a flexible dielectric adhesive cover one, two, three, or more layers, and a method for making an interposer of Group III being related similar to Groups I and II. This is not found persuasive because firstly, applicant recites "at least one layer of a flexible dielectric adhesive" can be one layer. Second, examiner has distinct "at least two adjacent layers" which are start at two layers, one layer is not equal to two layers; therefore, Group I is distinct from Group II. The method for making the interposer first would be classified in a different class and can be made with different processes than Groups I and II, for example, applicant relies on a process of plating a solderable metal on an exposed end of conductive vias; however, the process of coating, etching, or any machinery can be used to solderable metal on the exposed end of the conductive vias instead of plating process.

The requirement is still deemed proper and is therefore made FINAL. Claims 1-15 of Group I, and claims 37-51 of Group III are withdrawn from further consideration as being drawn to non-elected subject matter.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "110" has been used to designate both substrate and flexible interposer. A proposed drawing correction or corrected drawings are required in

reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to because **element contact 112** does not shown as describe in figure 1. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities:

Page 8, line 31, change "next-level substrate 110" to --next-level substrate 140--.

Page 10, lines 23 and 26, applicant needs to submit U. S. Patent number (fill in a blank).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 16-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 16, it is unclear. Applicant recites a limitation claim 16, line 8

"...of one of an electronic device and a substrate" also, line 12, applicant recites

another limitation of "conductive vias...of an electronic device and a substrate".

Does applicant meant "more than one of electronic devices and substrates?"

Regarding claim 23, it is unclear. Applicant recites a limitation claim 23, line 9

"...of one of an electronic device and a substrate" also, line 14, applicant recites

another limitation of "conductive vias...of an electronic device and a substrate".

Does applicant meant "more than one of electronic devices and substrates?"

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 16-30, and 32-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over DiStefano et al. (Reference cited by applicant) in view of Korleski (U. S. Patent 5,545,475).

As best understood to claims 16, 18-19, and 22, DiStefano discloses a solderable flexible adhesive interposer (12, column 7, line 65) as shown in figures 1-12 comprising:

at least one layer of flexible dielectric adhesive (38, 40-figure 2, column 9, lines 48-59) having a modulus of elasticity,

a plurality of conductive vias (column 10, line 32) through said layer of flexible dielectric adhesive, said plurality of conductive vias being of a flexible electrically

conductive adhesive (48, column 10, line 42) having a modulus of elasticity and being in a pattern adapted for connection to contacts of one of an electronic device and a substrate, and

a solderable electrically conductive metal (22, column 8, line 9) formed on at least one exposed surface of said conductive vias and in electrical contact therewith,

wherein at least one end of the plurality of conductive vias includes contacts adapted to be soldered to one of an electronic device and a substrate.

DiStefano does not disclose flexible dielectric and conductive adhesives having the modulus of elasticity less than about 20,000psi.

Korleski shows tensile material having properties, which is range from 2-500,000psi (see control sample of table 1).

It would have been obvious to one ordinary skill in the art at the time the invention was made to use flexible dielectric and conductive adhesives as type of material having the modulus of elasticity less than about 20,000psi as taught by Korleski to employ the material of DiStefano for purpose of increase of flexibility, reduce cost, and less expensive to perform an assembly.

As to claims 23, 25-26, and 29, DiStefano discloses the interposer (12) as shown in figures 1-12 comprising:

a plurality of layers (38, 40) of flexible dielectric adhesive having a modulus of elasticity;

a plurality of conductive vias (holes) through each of said layers of flexible dielectric adhesive, said plurality of conductive vias being of a flexible electrically

conductive adhesive (48) having a modulus of elasticity, said conductive vias in an exposed one of said plurality of flexible dielectric adhesive layers being in a pattern adapted for connection to contacts of one of an electronic device and a substrate;

a solderable electrically conductive metal formed on an exposed surface of said conductive vias of the exposed one of said flexible dielectric adhesive layers and in electrical contact therewith, wherein at least one end of the plurality of conductive vias includes contacts adapted to be soldered to one of an electronic device and a substrate;

said plurality of conductive vias in each said layer of flexible dielectric adhesive being in a pattern corresponding at least in part to a pattern of said plurality of conductive vias of the adjacent layers of said flexible dielectric adhesive; and

a conductor (42, column 10, line 8) residing between at least two of said adjacent layers (38, 40) of flexible dielectric adhesive, wherein said conductor is patterned and is in electrical contact with ones of said conductive vias of each of the at least two of said layers of flexible dielectric adhesive.

DiStefano does not disclose flexible dielectric and conductive adhesives having the modulus of elasticity less than about 20,000psi.

Korleski shows tensile material having properties, which is range from 2-500,000psi (see control sample of table 1).

It would have been obvious to one ordinary skill in the art at the time the invention was made to use flexible dielectric and conductive adhesives as type of material having the modulus of elasticity less than about 20,000psi as taught by Korleski

to employ the material of DiStefano for purpose of increase of flexibility, reduce cost, and less expensive to perform an assembly.

As to claims 30, 32-33, and 36, Don discloses a panel (10) of a plurality of electronic devices having a pattern of contacts (22) thereon and solderable flexible adhesive connections (38, 40) formed on the contacts comprising:

- a layer of an oxidation-resistant metal (the pattern of contacts 22) on the contacts of the electronic devices of said panel;

- a plurality of electrically conductive bumps (48) formed of a flexible electrically conductive adhesive having a modulus of elasticity, wherein said plurality of bumps is deposited on the oxidation resistant layer in the pattern of contacts of the electronic device; and

- a solderable electrically conductive metal layer (24) formed on an exposed surface of said electrically conductive bumps distal the contacts of the electronic devices and in electrical contact therewith.

DiStefano does not disclose flexible dielectric and conductive adhesives having the modulus of elasticity less than about 20,000psi.

Korleski shows tensile material having properties, which is range from 2-500,000psi (see control sample of table 1).

It would have been obvious to one ordinary skill in the art at the time the invention was made to use flexible dielectric and conductive adhesives as type of material having the modulus of elasticity less than about 20,000psi as taught by Korleski

to employ the material of DiStefano for purpose of increase of flexibility, reduce cost, and less expensive to perform an assembly.

As to claims 17, 24, DiStefano discloses the interposer as shown in figures 1-12 wherein said plurality of conductive vias (holes) are in a pattern corresponding to a pattern of contacts of one of an electronic device and a substrate, said solderable flexible adhesive interposer further comprising patterned metal conductors (24-figures 3-6) on one surface of said layer of flexible dielectric adhesive fanning out from at least ones of said conductive vias to locations corresponding to the pattern of contacts of the other one of an electronic device and a substrate.

As to claims 20, 27, and 35, DiStefano discloses the interposer as shown in figures 1-4 wherein said solderable electrically conductive metal is selected from alloys (column 10, lines 60-61).

As to claims 21, 28, and 34, Don discloses the interposer as shown in figures 1-4 wherein said flexible conductive adhesive (48) is one of a thermosetting adhesive and a thermoplastic adhesive having a melt flow temperature that exceeds the melting temperature of solder (column 11, lines 1-27).

Allowable Subject Matter

9. Claim 31 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Neither the references cited nor the cited references in combination of claim 30 teach or suggest a panel of a plurality of electronic devices includes one of a semiconductor wafer having a plurality of semiconductor devices formed therein and a panel of electrical substrates having a plurality of electrical substrates formed therein.

Conclusion


10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lin et al., Yamamura et al., and Oxman et al. Disclose related art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan T Dinh whose telephone number is 703-306-5856. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on 703-305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-1341 for regular communications and 703-305-1341 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

TD
September 9, 2002


DAVID L. TALBOTT
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